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CONNECTICUT

AGRICULTURAL EXPERIMENT STATION

NEW HAVEN, CONN.

BULLETIN 130, JANUARY, 1900.

Commercial Feeding Stuffs in the Connecticut Market.

CONTENTS.

Notice as to Bulletins.

The Bulletins of this Station are mailed free to citizens of Connecticut who apply for them, and to others as far as the limited editions permit.

Applications should be renewed annually before January 1st.

The matter of all the Bulletins of this Station, in so far as it is new or of permanent value, will be made part of the Annual Report of the Station Staff.

All Bulletins earlier than No. 71 and Nos. 72, 83, 86, 93, 100, 101, 102, 105, 106, 111, 118 and 123 are exhausted and cannot be supplied.

Notice as to Supply of Station Reports.

The Station has no supply of its Annual Reports for the years 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1887, 1891, 1893 (Pt. II.), 1894 (Pt. I.), and 1895 (Pts. I. and II.).

The Annual Report of this Station, printed at State expense, is by law limited to an edition of 7,000 copies.

After exchanging with other Experiment Stations and Agricultural Journals, the Reports remaining at the disposal of the Station will be sent to citizens of Connecticut who shall seasonably apply for them, and to others as long as the supply lasts.

Former Reports Wanted.

There is frequent call for our earlier Annual Reports on the part of public libraries, students, chemists, naturalists, and station workers.

Persons who can supply copies of Reports of this Station for any of the years above named, will be likely to find purchasers by communicating with the Director.

COMMERCIAL FEEDING STUFFS.*

A public Act of the State of Connecticut approved June 20, 1899, and taking effect July 1, 1899, authorizes this Station to collect samples not exceeding two pounds in weight, for analysis, from any lot, parcel or package of concentrated commercial feeding stuff which may be in the possession of any manufacturer, importer, agent or dealer.

The manner of taking the samples is prescribed by law.

The Station is required to analyze at least one sample of each brand thus collected annually. It is also required to publish analyses of these feeds in Station Bulletins, "together with such other additional information in relation to the character, composition and use thereof as may seem to be of importance, and issue the same annually, or more frequently if deemed advisable."

USE OF COMMERCIAL FEEDING STUFFS.†

Commercial Feeding Stuffs are bought to supply certain deficiencies in the cattle food which is raised upon the farm.

Hay, corn fodder, ensilage and stover with corn meal, raised at home, form the basis and make up the bulk of the cattle food and supply all of the coarse feed and of the starch, sugar and fat which are required. They are, however, deficient in digestible protein.‡

*The microscopic work referred to in this paper was wholly done by A. L. Winton. The chemical analyses were mostly made by A. W. Ogden, W. L. Mitchell and Clifford Langley. The discussion of the results is by E. H. Jenkins.

†Reproduced in amended form from Bulletin No. 128.

‡Protein is the name now commonly given to a class of substances (also termed "proteids" or "albuminoids") of which the muscles, brain, nerves, tendons and all other working or necessary organs and parts of the animal body largely and essentially consist. Protein contains from 14 to 19 per cent. of nitrogen.

The white of eggs, the fiber of lean beef, the clot of blood, the curd of milk and the gluten of wheat are familiar examples of protein. Other similar matters are found in all animals and in all plants.

The animal cannot grow or long exist without constantly renewed supplies of protein in its food. The animal itself is totally unable to create protein. Only plants can originate protein, which they do from the plant-food of air, soil and fertilizers or manures. Animals can produce or create blood-protein, brain-protein, flesh-protein and milk-protein, but only by appropriating and transforming or making over the similar but different protein of plants.

Other needful food-substances or nutrients, such as cellulose (woody fiber), starch, sugars, gums, pentosans (that yield gums and jellies), acids and fats or fat oils, contain no nitrogen and collectively are commonly termed "non-nitrogenous matters"; we shall usually designate them as "non-protein."

Few farmers are now raising as much protein, in concentrated form, as is required to bring cattle up to and maintain them in the most profitable condition. Two chief defects in our present farm management are that little care is given to the raising of crops rich in protein and that, as a rule, insufficient protein goes into the food of our cattle.

If the quantity of digestible protein in the food is too small, the animals produce less beef or milk than they easily would with a proper supply of protein. Furthermore, when protein is deficient, the other (non-nitrogenous) matters of the ration are in excess of the animal's capacity for assimilating them and are therefore to some extent wasted. The latter (starch, sugar, etc.) in part pass through the body, incompletely digested and—unlike the protein—give little value to the manure.

To meet and overcome these defects in home-grown cattle food, dairymen and keepers of live-stock buy commercial feeds; they should buy them *chiefly* with the purpose of getting digestible protein in cheap and concentrated forms.

A feed rich in digestible protein is, when properly used, "milk-producing"; a feed rather poor in protein, however highly endorsed, cannot prove permanently satisfactory, or be a "milk producer" in any way superior to home-raised coarse feed and corn meal.

Every farm on which cattle are kept for profit should yield all the *hay, corn fodder, corn ensilage, corn stover* and *corn meal* which the live stock on it need to eat.

One hundred pounds of each of the feeds just named contain, on the average, the following quantities of *digestible nutrients* or elements of food:

TABLE I.—QUANTITIES OF DIGESTIBLE NUTRIENTS IN ONE HUNDRED POUNDS OF THE FEEDS NAMED.

(From Armsby, Penn. Ag'l Ex. Sta. Rep., 1897-98, p. 45.)

	Red Top Hay.	Corn Fodder Field-cured.	Corn Stover Field-cured.	Corn Ensilage.	Corn Meal.
Total dry matter.....	91.1	57.8	59.9	27.9	85.0
Digestible protein.....	4.8	2.5	2.0	1.1	5.5
Digestible non-protein*..	49.2	36.1	34.8	18.2	71.1
Ratio of digestible protein to digestible non-protein, ("Nutritive Ratio").....1:10.3		1:14.4	1:17.4	1:16.5	1:12.9

*Since fat is believed to have about 2¼ times the nutritive effect of starch and similar non-nitrogenous matters, the digestible fat is, in these calculations, reduced to its "starch equivalent" by multiplying by 2¼.

Observation and careful experiment have shown that milk cows need, per day and per 1,000 pounds of live weight, about 24 pounds of dry matter including 2 to 2½ pounds of digestible protein and from 13½ to 15 pounds of digestible non-protein (sugar, starch, fat, etc.), and that the quantity of digestible non-protein in this *standard ration* should be between five and one-half and seven times as great as the digestible protein.

Now a glance at the table above shows that no one of these staple farm products, nor any combination of them, can furnish the most profitable cattle food.

All of them have from ten to seventeen times as much non-protein as protein, and hence a properly balanced ration cannot be made up from them without adding some feed much richer in protein and poorer in non-protein than any one of them.

Feeds rich in protein are what the stock owner most commonly needs to buy, and they are the ones the purchase of which is most likely to be profitable. All feeds contain non-nitrogenous matters, starch, sugar, etc., but those best worth buying *should* have a considerably larger proportion of protein than any which are commonly raised on the farm.

In the preparation of vegetable foods for human consumption and in the manufacture of cotton seed and linseed oils, certain by-products are produced, unfit for human food, but rich in protein and valuable as feed for horses and cattle. There are also certain other products which are of very little value as cattle food because of the small amount of protein in them, or they are uneconomical to buy, because they contain no larger *proportion* of protein than corn meal which is raised on the farm.

Both kinds of by-products are now offered for sale, frequently without an analysis or other statement to inform the buyer as to the real nature or value of what he is purchasing, and in consequence a good deal of money is spent for cattle feeds uneconomically.

THE AVERAGE COMPOSITION OF COMMERCIAL FEEDING STUFFS.

In order to show the average composition of the various brands of feeding stuffs which are at present offered in the New England market as well as the range or variation of composition, Table I has been prepared. This includes the analyses, more than 1,600 in number, which have been published since May, 1898, in Bulletins 44, 47, 48 and 51 of the Maine Station, in Bulletins 53 and 56 of the Massachusetts Station and in Table II of this Bulletin.

Table I gives the number of analyses on which each average is based, the average percentages of protein and fat, and the highest and lowest percentages of each of these ingredients found in any single analysis.

In a few instances, where the figures found in a single analysis were such as to make it quite certain that the sample was adulterated or was not of the kind represented, they have been excluded from the average and from the minimum figures.

In some cases, not only is the lowest percentage of protein and fat given, but also the one or two percentages which stand next; for sometimes, among a large number of analyses, there is a single result very much lower than any other, which marks an extremely exceptional case.

ANALYSES OF THE COMMERCIAL FEEDS FOUND IN THE CONNECTICUT MARKET IN 1899.

During the year ending Nov. 1st, 1899, the Station has drawn two hundred and forty-one samples of commercial feeding stuffs and in conformity with law gives the results of their examination in Table II, pages 22 to 39 of this Bulletin.

The law prescribes that the analysis "shall include determinations of crude fat and crude protein and such other determinations as may at any time be deemed advisable."

The analyses here reported include determinations of moisture, ash, fiber and nitrogen-free extract, in addition to protein and fat. Many of the feeds have also been examined carefully with the microscope to determine what materials if any were present other than those named in the brand or label.

These feeds are classified as follows and are discussed in following pages in the order here given (see page 9):

TABLE I.—AVERAGE COMPOSITION OF FEEDS AS DETERMINED BY ANALYSES MADE IN THE NEW ENGLAND STATES, LATER THAN MAY, 1898, AND COMPILED BY THE CONN. AGRICULTURAL STATION, NEW HAVEN, CONN., JAN. 1, 1900.

	No. of Analyses.	Protein.			Fat.		
		Average.	Highest.	Lowest.	Average.	Highest.	Lowest.
Cotton Seed Meal, hulled, all analyses	205	45.4	52.6	40.3	11.2	17.0	6.5
			51.9	41.2			
			51.2	41.7			
" " Southern Cotton Oil Co's	33	45.3	48.3	41.4	10.7	13.1	9.1
" " Amer. Cotton Oil Co's	46	45.5	50.8	40.3	11.4	12.2	8.8
" " Sea Island, unhulled	8	26.8	36.1	24.4	7.0	8.2	5.8
Linseed Meal, New Process	31	38.2	42.2	34.6	2.4	3.5	1.8
				36.8			2.1
" " " Amer. Linseed Co's	23	38.5	42.2	34.6	2.2	3.5	1.9
				36.8			2.1
" " Old Process, all analyses	25	35.7	38.9	31.8	7.2	9.6	2.7
				31.8			4.7
							6.3
" " " Nat'l Linseed Oil Co's	11	37.2	38.9	35.1	6.7	9.6	2.7
				36.1			5.8
							5.9
Wheat Bran, all analyses	120	15.8	17.9	13.6	4.7	5.6	3.5
			17.8	13.9			3.9
" " from Winter Wheat	45	15.5	17.8	13.6	4.4	5.6	3.5
			17.4	13.9			3.9
			17.3				
" " from Spring Wheat	53	16.1	17.5	15.1	4.9	5.6	4.4
			17.5	15.1		5.3	4.5
Wheat Middlings, all analyses	135	17.0	22.2	12.4	5.0	7.1	2.6
			21.9	13.1		7.1	2.6
" " from Winter Wheat	20	16.0	17.9	12.4	4.8	5.1	4.4
			17.8	13.1		5.0	4.8
" " Spring Wheat	60	18.8	22.2	16.0	5.2	7.1	3.3
			21.9	16.5		5.9	3.4
			21.5	16.6			3.7
Mixed Wheat Feed, all analyses	219	16.6	20.0	14.0	4.7	5.8	3.6
" " from Winter Wheat	88	16.2	18.5	13.8	4.5	5.4	3.6
			18.1	14.0		5.3	3.9
				14.5		5.2	3.9
" " from Spring Wheat	60	17.3	19.8	15.6	4.9	5.5	3.8
			18.9	15.8		5.4	4.3
				16.2			4.4
Red Dog Flour	9	19.3	21.2	16.5	4.4	5.3	3.4
Corn Meal	17	9.5	10.8	8.6	4.0	4.7	2.7
				8.9			3.1
				9.0			
Atlantic Gluten Meal, Atlantic Starch Works	2	48.9	49.1	48.8	7.9	2.0	1.7
Chicago Gluten Meal, Glucose Sugar Rfg. Co.	76	36.7	41.3	31.7	2.7	7.6	1.4
							1.6
							1.7

TABLE I.—AVERAGE COMPOSITION OF FEEDS AS DETERMINED BY ANALYSES MADE IN THE NEW ENGLAND STATES, LATER THAN MAY, 1898, AND COMPILED BY THE CONN. AGRICULTURAL STATION, NEW HAVEN, CONN., JAN. 1, 1900—*Continued.*

	No. of Analyses.	Protein.			Fat.		
		Average.	Highest.	Lowest.	Average.	Highest.	Lowest.
Cream Gluten, Chas. Pope Glucose Co.	40	34.1	41.3	30.1	3.2	6.1	1.6
			41.2	30.9		5.4	1.7
			38.9	31.0		4.9	1.8
Buffalo Gluten Feed	34	27.5	29.6	25.3	3.1	4.7	2.3
			29.5	26.3		4.3	2.3
			29.0				2.5
Diamond Gluten	30	23.6	30.1	20.3	3.6	5.0	2.3
			27.0			4.4	2.8
			25.8				2.8
Golden Gluten	15	27.0	29 6	23.6	3.0	4.0	2.0
						3.4	2.1
Hominy Chops, White Meal	20	11.2	12.0	10.3	7.8	9.7	4.0
			11.8	10.7		9.5	5.1
			11.6	10.9		9.3	5.8
Ground Oats	3	11.0	13.7	8.3	4.0	5.0	3.2
Provender	22	9.4	10.8	7.9	3.8	5.4	2.9
			10.6	8.2		4.8	3.1
			10.5	8.3		4.5	3.2
Corn and Oat Feed, Victor Am. Cereal Co.	26	9.2	11.3	9.5	3.9	5.1	2.9
" " Various brands	17	9.5	12.3	8.2	3.7	7.1	2.7
Oat Feed, Crescent	3	7.9	8.6	7.3	3.3	3.7	3.0
" Quaker, Am. Cereal Co.*	36	10.3	12.8	7.4	3.4	4.3	2.6
			12.4	7.8		4.3	2.7
			11.7	7.9		4.1	2.8
" Various brands	16	9.3	12.6	4.4	4.2	8.8	1.5
Oatena	1	9.4	----	----	4.3	----	----
Corn, Oats and Barley Feed, American Cereal Co.	6	11.9	12.8	11.3	4.5	5.4	4.0
H. O. Co.'s Dairy Feed	20	19.0	21.2	15.5	4.4	5.4	3.7
			20.9	16.5		5.0	3.8
			20.6	17.1			3.8
" " Horse Feed	18	12.4	13.8	11.0	4.2	4.8	3.6
			13.7	11.1		4.5	3.8
			13.3	11.7		4.4	3.8
" " Poultry Feed	14	17.5	19.5	15.0	5.5	6.0	4.7
			18.3	16 7		5.1	4.8
			17.8	17.1		5.9	4.8
Am. Cereal Co.'s Quaker Dairy Feed	5	12.8	14.1	11.3	3.9	4.4	3.5
" " Am. Poultry Food	8	14.2	15.5	13.4	5.4	5.9	4.8
Blatchford's Calf Meal	3	27.7	33.4	24.8	4.8	5.2	4.4
Rye Bran	4	14.6	14.8	14.3	2.8	2.9	2.7
King Gluten, Des Moines Mill	39	32.9	37.1	26.4	15.4	19.8	11.7
				29 9			
" " Indianapolis Mill	10	34.6	37.3	32.1	4.8	6.9	2.7

* The American Cereal Co.'s Quaker Oat Feed is no longer made, being superseded by Dairy Quaker Feed.

	No. of Samples Examined.
Cotton Seed Meal	10
Linseed or Flax-seed Meal	12
Ground Wheat	1
Bran, from Winter Wheat	7
Spring Wheat	9
Unclassified	5
Middlings, from Winter Wheat	1
Spring Wheat	6
Unclassified	17
Mixed (Wheat) Feed, from Winter Wheat	15
Spring Wheat	7
Unclassified	25
Corn Meal	9
Gluten, Gluten Meal, Gluten Feed:	
Atlantic Gluten	2
Chicago Gluten	5
Pope Gluten	4
King Gluten	2
Buffalo Gluten Feed	6
Diamond Gluten	2
National Starch Co.'s Gluten Feed	2
Miscellaneous	6
Hominy Chops	8
Ground Oats	2
Provender	13
Corn and Oat Feed	6
Oat Feeds	14
Oat Chaff	1
Corn, Oats and Barley	2
Rye Bran and Rye Feed	5
Malt Hulls	1
Starch Feeds	2
Champion Bell Fodder	1
H. O. Dairy Feed	6
Horse Feed	9
Poultry Feed	3
American Cereal Co.'s Quaker Dairy Feed	5
Poultry Feed	1
Blatchford's Calf Meal	1
Pioneer Clover Meal	1
Carob Beans	1
Pods	1
Beans and Pods	1
Baum's Horse and Stock Food	1
Bowker's Animal Meal	1
Lederer's Chicken Food	1
Beef Scraps	1
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Cotton Seed Meal.

After removing the cotton fiber by machinery as far as possible, the black outer covering or "hull" of the cotton seed is broken off by machinery and separated from the yellow kernels or meats. These kernels are cooked and while still hot are subjected to hydraulic pressure, which removes a part of the oil

and leaves the residue, "cotton seed cake," in very hard plates or sheets which can be cut with a saw like boards. These cakes when broken and finely ground make the "cotton seed meal" of the feed market: the most concentrated cattle food which is in general use.

In the ten samples examined, the analyses of which appear in the table, page 22, no admixture of foreign matters was found and all were of good quality as regards chemical composition, the percentage of protein ranging from 49.38 to 44.20 and of fat from 12.96 to 8.55.

The average of many recent analyses of cotton seed meal gives 45.4 per cent. of protein and 11.2 per cent. of fat, while these ten samples contain on the average 46.4 per cent. of protein and 10.4 per cent. of fat.

Undecorticated cotton seed meal, full of black hulls and with only 30 per cent. of protein, and cotton seed meal adulterated with rice refuse, have been found in this State in times past. At present much more cotton seed meal is used in Connecticut as a fertilizer,—chiefly for tobacco,—than as a feed, and the frequent publication of analyses made in the interest of tobacco growers has driven out the inferior grades of cotton seed meal.

Guarantees.

Three of the samples were from lots having a guaranteed analysis. The guaranteed and actual percentages of protein and fat in these cases were as follows:

		Protein.		Fat.	
		Found.	Guaranteed.	Found.	Guaranteed.
12125	Dixie Bran.....	45.9	43–48	9.0	10–14
12126	Chapin & Co.....	44.2	43	12.8	9
12132	J. E. Soper & Co.	44.7	43	9.6	9

In neither case is there any deficiency of protein. In one case there is a per cent. less of fat than is guaranteed, but the protein in this sample is nearly three per cent. above the guarantee.

Linseed Meal.

For removing the oil from flaxseed or linseed two methods are employed. Under the "old process" the crushed seed, while warm, is subjected to hydraulic pressure which squeezes out much of the oil. The residue is in the form of hard cakes which when broken and ground make the "old process linseed

meal." Under the "new process" the oil is removed from the crushed seed by a solvent, like benzine, which is afterwards fully removed from the residue by steaming. The extracted residue is "new process" meal.

Practically all the flax seed on the feed market has been treated by one or other of these processes. New process linseed meal contains on the average two and a half per cent. more of protein and four and three-quarters per cent. less of oil or "fat" than old process meal.

Of the twelve samples examined none were found in any way adulterated.

Samples 12156 and 12074 (though labeled "old process") and samples 12088 and 11567 are new process meals, as is indicated by the low percentage of fat.

Samples 11385, 11381 and 11585 are inferior, because of their low percentages of protein.

Wheat Feeds.

These are by-products in the manufacture of wheat flour. Several different processes of milling are in common use yielding by-products which are not entirely alike in composition. There are also differences in composition between the products from winter wheat and those from spring wheat.

Wheat Bran consists of the outer layers of the wheat berry which are dark in color and do not easily pulverize.

Wheat Middlings,—as found in the feed market—, consist of inner layers of the covering of the berry, which are lighter in color and more easily pulverized than bran, and of other parts from which fine white flour cannot be made. Red Dog Flour is the poorest grade of flour, off color and often sold as a cattle food.

It is also used for paste and in making "pancake leather"—composed of leather scraps and flour paste, compacted by hydraulic pressure, stated to be made up into soles for children's shoes.

Many mills do not sell bran and middlings separately, but run them together and sell the product as "Mixed Feed."

Red Dog Flour is also sometimes run in to the Mixed Feed.

In the compilation on page 7 as well as in the tabulation of the wheat products analyzed at this Station, which appears on pages 22 to 29, the product from the following mills is classed as from winter wheat:

Acme Milling Co., Indianapolis, Ind.
American Cereal Co., Chicago.
Blish Milling Co., Seymour, Ind.
Cole, H. C., Milling Co., Chester, Ills.
Eldred Mill Co., Jackson, Mich.
Evans, Geo. F., Hoosier Mills, Indianapolis, Ind.
Hannibal Milling Co., Hannibal, Mo.
Harter, Isaac, & Co., Galena, O.
Holly Milling Co.
Hunter Bros., St. Louis.
Jenks, J., & Co., Sand Beach, Mich.
Kehlor Bros., St. Louis, Mo.
Lawrenceburg Roller Mills Co. "Snowflake," Lawrenceburg, Ind.
Lexington Roller Mill Co., Lexington, Ky.
Maumee Valley Milling Co., Defiance, Ohio.
McDaniel & Pitman Co., Franklin, Ind.
Meyer, J. T. & Co., Clinton, Mo.
Miles & Son, Frankfort, Ky.
Model Roller Mills, Nashville, Tenn.
Moore, R. P., Milling Co., Princeton, Ind.
Rex Milling Co., Kansas City, Mo.
Saginaw Milling Co., Saginaw, Mich.
Stock, F. W., Hillsdale, Mich.
Stott's Flour Mills, Detroit, Mich.
Taylor Bros. Milling Co., Quincy, Ill.
Valley City Milling Co., Grand Rapids, Mich.
Voigt Milling Co., Grand Rapids, Mich.
Walsh De Roo Milling Co., Holland, Mich.

The wheat products from the following mills are classed as from spring wheat:

Anchor Milling Co., Superior, Wis.
Bay State Milling Co., Winona, Wis.
Daisy Roller Mill Co., Milwaukee, Wis.
Duluth Imperial Mill Co., Duluth.
Freeman Milling Co., Superior, Wis.
Grafton Roller Mills, Grafton, N. D.
Lake Superior Mills, Superior, Wis.
Listman, Wm., Milling Co., Superior, Wis.
Minkota Milling Co., Superior, Wis.
Moseley & Motley Milling Co., Rochester, N. Y.
North Dakota Milling Association, No. Dakota.
North Western Consolidated Milling Co., Minneapolis.
Pillsbury-Washburn Co., Minneapolis.
Russell & Miller Milling Co., Superior, Wis.
Star & Crescent Milling Co., Chicago.
Washburn-Crosby Co., Minneapolis.
Whitney & Wilson, Rochester, N. Y.

At present, winter wheat bran is worth on the average about seventy-five cents per ton more than spring bran, although the latter as a rule contains a half per cent. more of protein and a per cent. more of fat than the former.

But white winter wheat bran (from Michigan or Canada) sells for from seventy-five cents to a dollar per ton more than the common red wheat.

Ground Wheat.

A single sample was analyzed and found free from admixture with foreign matters.

Wheat Bran.

Eight samples of winter wheat bran and nine of spring wheat bran were analyzed. Regarding four others it is not known which kind of wheat they represent. In none of them was there any evidence of adulteration.

All the winter brans contained more than the average percentage amounts of protein. In several of the spring brans the percentage of protein was rather low.

Occasionally "cheap" bran is offered for several dollars a ton below the regular market rates. Such "bargains" are to be looked upon with great suspicion. In a "cheap" bran referred to us from another State, microscopic examination showed the presence of finely ground corn cobs.

Middlings.

Six samples of spring wheat middlings, one of winter wheat middlings and seventeen regarding which it is not known whether they represent winter or spring wheat, were examined.

Of the unclassified middlings, Nos. 12159, 12144 and 14012 have such low percentages of protein and the two former such low percentages of fat as well, that unless they were sold under a guarantee which corresponded with their actual composition, or at a reduced price, the buyer would be justified in objecting to them.

Some sorts of middlings closely resemble bran, while others are very fine and starchy, having much the look and composition of wheat flour.

They also show a wide range of composition. Thus one of the samples contained over twenty per cent. of protein, while another contained less than thirteen. The price is practically the same, but the one is a valuable feed and the other is uneconomical to buy even at a much lower price.

As a rule spring wheat middlings contain two and one-half per cent. more of protein and a half of one per cent. more of fat than winter wheat middlings.

Mixed (Wheat) Feed.

Nineteen analyses of feed from winter wheat are given in the table, page 26, nine of feed from spring wheat and twenty of feed in which the kind of wheat is not specified.

Of the winter wheat feeds all are of good quality, a single one, 12802, being deficient in fat.

Of the spring wheat feeds two, 12105 and 12803, are rather low in protein, but all appear to be genuine wheat products free from adulteration.

The same is true of the twenty-five samples of feed in which the kind of wheat is not specified.

Mixed feed from spring wheat contains as a rule about eight-tenths per cent. more of protein and three-tenths per cent. more of fat than that from winter wheat.

Corn Meal.

In the table on page 28 to 30 are given nine analyses of this article which show the usual range of composition. They were all free from admixture with cobs or oher adulterant.

We have already called attention to the fact that while corn meal *raised on the farm* may be used in a ration, it has to be supplemented by more nitrogenous, more "concentrated" feeds. But it is poor economy to buy corn meal, for feeding milch cows, at a cost of $17 to $19 per ton, when wheat feeds and gluten feeds, which are much richer in protein and much more fit to balance the ration, can be bought at just about the same price as corn meal.

Old crop corn meal contains from ten to fourteen per cent. of moisture. New crop meal may contain twenty per cent. or more of moisture, with correspondingly lower percentages of other ingredients.

Gluten, Gluten Meal, Gluten Feed.

These are by-products obtained chiefly in the manufacture of glucose and corn (or wheat) starch.

The process used for separating these by-products by the Glucose Sugar Refining Co. of Chicago, at all its factories,—Chicago, Rockford and Peoria, Ill., Davenport and Marshall-

town, Iowa, may be outlined as follows: The corn, after soaking for twelve to twenty-four hours in warm water containing three-tenths of one per cent. of sulphurous acid, is ground with water which carries off the mill product in suspension. By rightly adjusting the amount of water and corn, the chits or germs separated by the grinding float on the surface and are skimmed off. A large percentage of oil may be removed from these chits by pressure and the germ cake may be sold by itself or in mixture as a cattle food.

After separating the germs, and straining to remove part of the starch, the residue is ground once more and again passed over sieves which retain the hull or husk of the kernel. This is dried, ground and sold as "corn chop." The gluten or nitrogenous matter of the kernel and the starch suspended in water which have passed together through the sieves are next run with water over settling tables, where the starch, by reason of its greater specific gravity, settles first out of the stream of water and is thus separated from the gluten. The gluten is dried, ground and sold as cattle food while the starch alone is used in the factory. It will be seen from this description that no chemical is used in this process, except a very small quantity of sulphurous acid which must be completely washed out with the large quantities of wash water used.

We are advised that the methods employed by the Charles Pope Glucose Co. and by the National Starch Manufacturing Co. in extracting these feeds are essentially like those used by the Glucose Sugar Refining Co.

On pages 30 to 33 are given the analyses of gluten meal and gluten feed which have been lately made at this Station.

Atlantic Gluten Meal, made by the Atlantic Starch Works, Westport, Conn., is derived from wheat, being a by-product in the manufacture of wheat starch, and contains a larger percentage of protein than any other feed in our markets.

The manufacturers guarantee 38-40 per cent. of protein and the two samples analyzed contained respectively 48.8 and 49.1 per cent. with 1.70 and 2.04 per cent. of fat.

The manufacturers of *Chicago Gluten Meal* state that it contains 36 per cent. of protein and 3.0 per cent. of fat, but we are informed that this statement refers to the *dry matter* of the meal.

The lowest percentage of protein found *in the dry matter* of any sample was 38.8 and the lowest percentage of fat 1.95. But the sample with this low percentage of fat contained *in the dry matter* 43.8 per cent. of protein, nearly seven per cent. more of protein than the guarantee, and for feeding purposes is of course worth to the buyer more than gluten meal which contains the exact guaranteed amounts of protein and fat. The five samples of Chicago gluten meal contain on the average 12.32 per cent. of water, 37.17 of protein and 2.5 of fat: or calculated on the dry matter 42.2 per cent. of protein and 2.85 of fat.

Cream Gluten Meal, made by the Chas. Pope Glucose Co. of Chicago, is stated by the manufacturers to contain 34.12 per cent. of protein and 3.20 of fat. In the four samples examined protein ranges from 32.12 to 35.37 per cent. and fat from 1.70 to 3.78 per cent., while the average figures were 33.91 per cent. of protein and 2.44 per cent. of fat; nearly two per cent. more of protein and a half per cent. less of fat than the guarantee.

King Gluten is made by the National Starch Manufacturing Co. at two factories, and the product of these factories is quite unlike in composition.

As appears in the table on page 30 the product of the Indianapolis mill contains about 34.6 per cent. of protein and 4.8 per cent. of fat, while that of the Des Moines mill contains 32.9 per cent. protein and 15.3 per cent. fat. Buyers should find out, before purchasing, which product they are getting, for the one brand covers two very different feeds.

Gluten Feed. The gluten feed now made by the Glucose Sugar Refining Co. at its several factories is stated to be uniform in composition. The output of the Davenport factory is sold under the brand "Davenport Gluten Feed." That of the Marshalltown factory is branded "Marshalltown Gluten Feed"; that of the Peoria factory is branded "Buffalo Gluten Feed" and that of the Rockford factory as "Rockford Diamond Gluten Feed." "Golden Gluten Feed" is no longer sent out under that brand.

All these brands, as made at the present time, are stated by the manufacturer to contain 27.0 per cent. of protein and three per cent. of fat *in the dry matter.*

The six samples of *Buffalo Gluten Feed* contained on the average (9.63 per cent. of water) 30.2 per cent. protein and 3.6 per cent. of fat. The protein in the dry matter of all was well above 27 per cent.

In one case the fat was below 3 per cent.

The percentages of protein in the three samples of "Rockford" gluten feed and the two of "Diamond" gluten feed ranged from 22.81 to 30.12. It is possible that some of these samples represented feed manufactured before the consolidation of these factories and the introduction of uniform methods of preparation.

The gluten feed made by the National Starch Mfg. Co. apparently has no guarantee.

Hominy Chops.

Also called hominy feed, white meal, Baltimore meal, is a by-product from the manufacture of hominy. The eight samples analyzed were of average composition and no evidence of adulterants was found in them.

Ground Oats.

Of the two samples examined, one, 11558, is of inferior quality, having much less protein and fat than should be present and much more fiber. It is made of light and inferior oats or oat hulls or clippings have been mixed with it. Oats contain, on the average, 11.8 per cent. of protein, 5.0 per cent. of fat and 9.5 per cent. of fiber.

Provender.

This is supposed to be a mixture of equal weights of ground corn and oats.

The thirteen analyses show a wide range of composition and two of them at least, 12904 and 11356, have such low percentages of protein together with such large percentages of fiber as to make it probable that oat hulls have been added to them. Provender to be of good quality should certainly contain at least ten per cent. of protein.

Corn and Oat Feeds.

In the table are given analyses of six samples of this class which have about the same composition as provender, most of them containing however a larger percentage of fiber (hulls).

The Victor Corn and Oat Feed, made by the American Cereal Co., is the only brand, in this class, bearing a statement of composition. The guarantee is 9.46 per cent. of protein and 3.92 per cent. of fat. One of the samples, 11365, falls short of the guaranteed protein by nearly one per cent. and of the guaranteed fat by one and three-tenths per cent.

Champion Bell Fodder, 12127, is simply a corn and oat feed of average quality, under another name.

OAT FEEDS.

Analyses of fourteen samples of Oat Feed appear in the table and one of Oat Chaff.

Those made by the American Cereal Co. contain a fair amount of protein and fat.

The same is true of 12903. But all the others contain far less protein than good corn meal even and almost or quite as much woody fiber as good hay.

They are factory wastes of very inferior feeding value, consisting largely of oat chaff, which are sold to dairymen in this State for nearly the same price as good wheat bran.

No feeder can afford to use them, however cheaply he can buy them. They ought not to have a place in the feed market.

Oat chaff, as appears in the table, 12190, can be bought under its true name for $7.00 per ton. It can be bought under the name of "Oat Feed," as also appears in the table, 12197, for $15.00 a ton.

Some of the oat feeds contained some wheat, but no other foreign matter was detected.

The Quaker Oat Feed is the only brand which has the guaranteed statement of composition which the law requires.

This guarantee is, protein 12.03 per cent., fat 3.49 per cent. Only one of the four samples contained the guaranteed amount of protein, and three of them contained much less than this amount.

We are informed by the manufacturers that Quaker Oat Feed is no longer made, being superseded by Quaker Dairy Feed.

Corn, Oats and Barley.

Two samples bearing this brand, made by the American Cereal Co., have about the same composition as their oat feed, though with less fiber.

Other Mixed Feeds.

Feeds made by the H. O. Co., Buffalo, N. Y.

H. O. Dairy Feed. Six samples of this article have been examined. The chemical analyses given in the table show them to have a tolerably uniform composition, differing from bran in having somewhat more protein, considerably more woody fiber and less carbhydrates and fat. Microscopic examination shows them to be mixtures of oats, corn, wheat and cotton seed.

This brand is guaranteed by the manufacturers to contain 18 per cent. of protein and 4.5 per cent. of fat.

Two of the analyses fall slightly below the guaranteed protein and none of the samples contain the guaranteed percentage of fat.

H. O. Horse Feed. Nine samples of this article have been examined. It consist of oats, corn, wheat and linseed. Twelve per cent. of protein are guaranteed in this brand and four and a half per cent. of fat. With one exception the analyses substantially came up to the guaranteed protein, but all show less fat than is guaranteed.

H. O. Poultry Food. Three samples of this material also appear in the table. They contain oats, corn and wheat, and are guaranteed to contain 17 per cent. of protein and 5.50 per cent. of fat.

One of the samples contains two per cent. less of protein and nearly one per cent. less of fat than is guaranteed.

Feeds made by the American Cereal Co., Chicago, Ill.

Quaker Dairy Feed. The analyses of five samples of this feed are given in the table. The feed is composed of oats and wheat and guaranteed to contain 12.09 per cent. of protein and 3.49 per cent. of fat. The percentage of fiber shows the presence of a considerable quantity of oat hulls. In two of the samples the percentage of protein fell below the guaranteed amount. One analysis is also given of the *American Poultry Food,* made by the same company, and one of their *Stock Food.*

Blatchford's Calf Meal.

Called "The Perfect Milk Substitute." The directions for using, however, indicate that for very young calves it is to be used with skim milk and for older calves a double handful is given daily, *in addition to their other feed.* The quality and quantity of the other feed would affect somewhat the profitableness of this feed, which costs $3.50 per 100 pounds.

The sample examined contained linseed meal, a starchy bean meal, wheat middlings, cotton seed meal, carob bean and husk and fenugreek. It contains about the same percentages of protein, fat and nitrogen-free extract as the gluten feeds.

Rye Bran and Rye Feed.

The five samples examined were genuine and of very similar composition. Rye bran sells for the same price as wheat feeds and contains less fat and from one and one-half to two per cent. less of protein. It is of less value in "balancing" a ration than the wheat feeds and therefore cannot be as economical a feed to purchase. All the samples consisted wholly of rye. None of them had any guaranteed statement of composition.

Malt Hulls.

A single analysis, 12261, of this feed shows it to be of inferior value as a feed. It represents a sample sent to T. S. Gold, West Cornwall, by a feed dealer in Chicago.

Starch Feeds.

Schumacher's Starch Feed, **12078,** contains much less protein than wheat bran and is of no value in balancing a ration. It contains oats, corn and wheat. The dry Glen Cove Starch Feed, **12135,** ranks in composition with the gluten feeds, and contains as much protein as the best wheat brans.

Pioneer Clover Meal.

This material, No. 12189, is put up for a poultry food and claims to be, and apparently is, ground clover hay. Its cost is $1.00 for 50 pounds.

Carob Beans.

As this material forms a part of one of the mixed feeds above referred to and as no analyses of beans and pods were at hand, analyses were made both of the beans and pods, from which is calculated the composition of bean and pod together.

In one hundred parts of the unopened pods are 7.5 parts by weight of seed and 92.5 parts of empty "husks" or pods. The analyses were as follows:

	Seeds.	Husks.	Full Pods. (Seed and Husk.)
Water	12.84	14.15	14.05
Ash	3.27	3.25	3.26
Protein	15.00	4.81	5.57
Starch*	....	.85	....
Sugars and dextrines†	5.31	40.63	41.56
Reducing sugar‡	None	3.62	3.25
Other nitrogen-free extract	54.59	27.67	26.99
Fiber	7.16	4.80	4.98
Fat	1.83	.22	.34
	100.00	100.00	100.00

American Cattle Feeding Salts.

No. 12192, made by the American Cattle Feeding Salts Co., 138-140 55th St., New York City. John M. Draper, Agricultural and Research Chemist, Manager.

Said to consist of "various tonic substances and natural salts," which when added to the other feeds is a "means of growing prime beef, brighter in color, wavy or marbled in texture, and with pure white fat, in much less time than is possible under the present system of feeding."

The "Salts" contain about 16 per cent. of common salt, 63½ per cent. of Glaubers salts, 4.8 per cent. of Epsom salts, 9.3 per cent. of carbonate of soda, a per cent. and a half of matter insoluble in water and for the rest contains water and some volatile matter.

The last three analyses of the table are of beef scraps and animal meal used as poultry food.

*By diastase method.

†Carbhydrates soluble in water calculated as dextrose after hydrolizing with acid and deducting "reducing sugars."

‡Reducing power of aqueous extract determined without hydrolysis.

Table II.—Analyses of Commercial Feeds.

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
12092	Cotton Seed Meal		East Hartford, G. M. White & Son
12125	" Dixie Brand		Hamden, Ira W. Beers
12126	"	Chapin & Co., St. Louis	" "
12103	" American		Hartford, Daniels Mill Co.
12071	"		" C. A. Pease & Co.
12087	"		" Smith, Northam & Co.
11379	"	J. E. Soper & Co., Boston	New Britain, M. D. Stanley
12132	"	" " "	New Haven, R. G. Davis
12149	"		" Abner Hendee
12895	"		" "
			Average of the above 10 analyses of Cotton Seed Meal
			Average of 205 recent analyses
			Highest
			Lowest
12093	Linseed Meal		East Hartford, G. M. White & Son
11395	"		Hartford, Daniels Mill Co.
12074	" "Old Process"		" C. A. Pease & Co.
12088	"		" Smith, Northam & Co.
11392	"	Hunter Bros., St. Louis, Mo.	Middletown, Meech & Stoddard
11385	"	Chapin & Co., Boston	New Britain, Hugh Reynolds
11381	"	J. E. Soper & Co., Boston	" M. D. Stanley
12156	" "Old Process"		New Haven, J. T. Benham
12147	"	Hunter Bros., St. Louis	" Abner Hendee
12894	" "Old Process"		" "
11567	Flax Meal	American Linseed Co.	New London, Beebe & Bragan
11585	Linseed Meal		Willimantic, H. A. Bugbee
			Average of the above 8 analyses of Old Process Linseed Meal
			Average of 25 recent analyses Old Process
			Highest
			Lowest
			Average of the above 4 analyses of New Process Linseed Meal
			Average of 31 recent analyses, New Process
			Highest
			Lowest
12194	Ground Wheat	C. M. Cox & Co., Boston	Torrington, B. C. Patterson
	Bran from Winter Wheat.		
12806	Bran, Winter Wheat		Hartford, Smith, Northam & Co.
12801	" Michigan		" " "
11383	"	City Mills Co., N. Y.	New Britain, Hugh Reynolds
11565	"	Hollister, Crane & Co.	New London, Beebe & Bragan
12131	" Coarse Amber Wheat		New Haven, R. G. Davis

SAMPLED IN 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
12092	9.10	5 90	48.83	4.24	23.38	8.55	$24.00
12125	8.80	6.72	45 88	4.27	25.30	9.03	23.00
12126	7.72	7.52	44.20	5.70	22.09	12.77	23.00
12103	7.74	7.40	45.76	6.92	21.23	10.95	24.00
12071	8.20	6.48	49 38	4 41	22.54	8.99	25.00
12087	8.85	7.33	46 01	5.33	21.36	11.12	23.00
11379	6.84	7.86	47.00	5.76	21.23	11.31	26.00
12132	9.15	5.88	44.69	5 87	24 83	9.58	25.00
12149	9.09	6.48	48.38	4.87	22.59	8.59	24.00
12895	7.14	7.42	43.94	4.69	23.85	12.96	25.00
	8.26	6.90	46.41	5.53	22.52	10.38	
	----	----	45.4	----	----	11.2	
	----	----	52.6	----	----	17.0	
	----	----	40.3	----	----	6.5	
12093	10.71	5.56	35 07	7.48	31.59	9.59	28.00
11395	10.71	4.90	36.19	8 56	34 97	4.67	27.00
12074	11.16	5.56	36.07	8.39	36.59	2.23	29.50
12088	9.77	6.24	38.13	8.11	35.04	2.71	26.00
11392	10.28	6.06	34.56	8.00	32.00	9.10	28.00
11385	10.58	5.13	31.81	8.85	36.97	6.66	----
11381	10 20	5.50	32 06	8.79	36.67	6.78	30.00
12156	10.83	5.61	36 26	8.58	36.89	1.83	29.00
12147	9.82	6.62	33 76	7.12	33.54	9.14	28.00
12894	6.94	6.60	34.37	7.08	35.59	9 42	30.00
11567	11.17	5.15	40.44	7.64	32.62	2.98	28.00
11585	9 76	5.64	32.94	8.51	36.89	6.26	30.00
	9.87	5.75	33.84	8.05	34.79	7.70	
	----	----	35.7	----	----	7.2	
	----	----	38.9	----	----	9.6	
	----	----	31.8	----	----	4.7	
	10.73	5.64	37.72	8.18	35.29	2.44	
	----	----	38.2	----	----	2.4	
	----	----	42.2	----	----	3.5	
	----	----	34.6	----	---	1.8	
12194	12.02	5.48	18.12	6.34	53.17	4.87	18.00*
12806	12.80	5.00	17.37	6.92	53.99	3.92	----
12801	13.26	6.27	15.69	8.80	51.80	4.18	----
11383	10.84	6.49	15.62	9.01	53.47	4.57	----
11565	11.31	6.16	15.37	9.59	53.18	4.39	21.00
12131	10.17	6.93	16.19	8.18	54.24	4.29	19.00

* Car load lots delivered.

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
12151	Bran, White Mich.		New Haven, J. T. Benham
12900	" White Wheat		" Abner Hendee
11576	"	Valley City Milling Co., Grand Rapids	Norwich, Joseph Connor & Son
			Average of the above 8 analyses of Winter Wheat Bran
			Average of 45 recent analyses
			Highest
			Lowest
	Bran from Spring Wheat.		
11372	Bran, Spring Wheat	Pillsbury	Berlin, T. B. Wickwire
12096	"		East Hartford, G. M. White & Co.
11398	"	Freeman Milling Co.	Hartford, Daniels Mill Co.
12805	"	Pillsbury	" Smith, Northam & Co.
12081	"	"	" E. P. Yates & Co.
11384	"	Washburn, Crosby Co.	New Britain, Hugh Reynolds
12152	" Coarse		New Haven, J. T. Benham
12906	" Red Wheat		" Abner Hendee
11569	"	Washburn, Crosby Co.	New London, Arnold Rudd
			Average of the above 9 analyses of Spring Wheat Bran
			Average of 53 recent analyses
			Highest
			Lowest
	Bran Unclassified.		
12115	Bran	T. B. Chase & Son, N. Y.	Bridgeport, Taylor & Clark
12077	"		Hartford, Cummings & Garvin
12065	"		" C. A. Pease & Co.
11389	"	Ferguson & Lewis, Rochester	Middletown, Meech & Stoddard
	Middlings, Spring Wheat		
12800	A	Pillsbury	Hartford, Smith, Northam & Co.
12804	B	"	" " "
11396	B	"	" Daniels Mill Co.
12160			New Haven, J. T. Benham
12137	Coarse	Northwestern Consolidated Milling Co., Minneapolis	" R. G. Davis
12901	No. 2		" Abner Hendee
			Average of the above 6 analyses of Spring Wheat Middlings
			Average of 60 recent analyses
			Highest
			Lowest
	Middlings, Winter Wheat.		
11575		Valley City Milling Co., Grand Rapids	Norwich, Joseph Connor & Sons
			Average of 20 recent analyses
			Highest
			Lowest

Sampled in 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
12151	9.98	5.98	16.13	8.20	55.20	4.51	$19.00
12900	8.06	6.53	15.94	8.74	56.61	4.12	20.00
11576	11.40	5.33	15.25	8.32	55.37	4.33	----
	10.98	6.08	15.94	8.46	54.25	4.29	
	----	----	**15.5**	----	----	**4.4**	
	----	----	17.8	----	----	5.6	
	----	----	13.6	----	----	3.5	
11372	10.53	6.98	15.56	12.12	49.87	4.94	19.00
12096	9.74	6.51	16.37	8.87	53.37	5.14	20.00
11398	11.88	5.80	15.81	7.83	54.26	4.42	20.00
12805	12.99	6.72	15.06	10.96	49.84	4.43	----
12081	11.31	6.54	15.75	10.42	50.92	5.06	20.00
11384	11.45	6.40	15.12	10.37	52.03	4.63	----
12152	10.25	6.54	15.31	11.56	51.28	5.06	18.00
12906	8.20	5.86	16.37	9.11	55.95	4.51	18.00
11569	11.44	6.01	15.44	10.59	52.15	4.37	19.00
	10.86	6.37	15.64	10.20	52.20	4.73	
	----	----	**16.1**	----	----	**4.9**	
	----	----	17.5	----	----	5.6	
	----	----	15.1	----	----	4.4	
12115	9.86	6.27	15.75	9.68	53.76	4.68	18.00
12077	10.39	5.79	16.94	8.04	53.78	5.06	20.00
12065	10.75	6.35	15.75	9.46	52.86	4.83	20.50
11389	11.65	5.50	15.31	8.50	54.91	4.13	21.50
12800	12.18	3.33	18.06	5.36	56.26	4.81	----
12804	12.28	5.30	16.50	9.53	51.04	5.35	----
11396	11.48	5.52	17.19	10.26	50.06	5.49	21.00
12160	11.06	4.71	17.32	9.48	51.67	5.76	19.00
12137	11.63	5.45	16.00	10.31	51.57	5.04	17.00
12901	8.43	5.18	16.69	10.07	54.38	5.25	20.00
	11.17	4.91	16.96	9.17	52.51	5.28	
	----	----	**18.8**	----	----	**5.2**	
	----	----	22.2	----	----	7.1	
	----	----	16.0	----	----	3.3	
11575	11.76	4.37	15.87	6.87	56.71	4.42	19.00
			16.0			**4.8**	
			17.9			5.1	
			12.4			4.4	

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
	Middlings, unclassified.		
12113		T. B. Chase & Son, New York	Bridgeport, Taylor & Clark
12111			Bristol, W. O. Goodsell
11557	Puritan	J. T. Benham, New Haven	Guilford, G. F. Walter
12067	N. Y. Brand No. 2		Hartford, C. A. Pease & Co.
12066	No. 1 N. Y. Brand		" " "
12084			" E. P. Yates & Co.
12159	White		New Haven, J. T. Benham
12142	Fine		" R. G. Davis
12144	Fine		" Abner Hendee
12143	Coarse		" "
11566		New York City Mills	New London, Beebe & Bragan
11571		Whitney & Wilson, Rochester	" Arnold Rudd
11578		F. W. Stock, Millsdale, Mich.	Norwich, A. A. Beckwith
12195		C. M. Cox & Co., Boston	Torrington, B. C. Patterson
12193		" "	" "
11584		Bay State Co., Winona, Minn.	Willimantic, H. A. Bugbee
14012	Middlings, Colonial	Miner, Hillard Milling Co.	New Haven, Abner Hendee
	Mixed Feed from Winter Wheat.		
11367	Anchor	C. M. Cox & Co., Boston	Berlin, J. C. Lincoln
11368	Buckeye	American Cereal Co., Chicago	" "
11559	"	American Cereal Co., Chicago	Guilford, F. H. Rolf
11560	I. Harter Co.'s	Isaac Harter Co., Toledo	" "
12122	Coarse		Hamden, Ira W. Beers
12121	Medium Snow Flake Brand		" "
11397	Anchor	Anchor Mill Co., Superior	Hartford, Daniels Mill Co.
12069	Acme		" C. A. Pease & Co.
12802			" Smith, Northam & Co.
11359	Snow Flake Brand	Lawrenceberg Mills Co., Ind.	Meriden, Meriden Grain & Feed Co.
11364	Buckeye	American Cereal Co., Chicago	" A. H. Cashen
11378	Snow Flake	Lawrenceberg Mills Co., Ind.	New Britain, M. D. Stanley
11387	Hannibal Mixed Feed	Hannibal Milling Co., Hannibal, Mo.	" Hugh Reynolds
12153			New Haven, J. T. Benham
12128			" R. G. Davis
14017	Snow Flake Brand	C. M. Cox & Co., Boston	North Haven, The Co-Op. Feed Co.
11594	Acme Feed	Acme Co., Indianapolis	Rockville, Edward White
14016	Mixed Feed	Miles & Son, Frankfort, Ky.	North Haven, Cooperative Feed Co.

SAMPLED IN 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
12113	11.58	4.18	18.63	5.00	54.35	6.26	$19.00
12111	11.07	4.29	14.38	5.57	60.34	4.35	----
11557	11.86	4.24	17.56	7.11	54.40	4.83	21.00
12067	10.44	4.30	18.44	6.59	55.18	5.05	20.00
12066	10.50	4.32	20.13	4.68	54.60	5.77	21.50
12084	13.92	5.27	19.19	6.98	52.92	1.72	21.00
12159	12.23	2.86	13.69	3.03	65.31	2.88	20.00
12142	12.08	4.44	17.25	4.94	55.88	5.41	18.00
12144	12.61	3.68	12.85	1.05	67.15	2.70	20.00
12143	11.32	4.69	17.88	8.11	52.09	5.91	18.00
11566	10.92	4.91	17.75	4.48	54.24	7.70	21.00
11571	12.74	3.58	17.31	6.31	54.56	5.50	20.00
11578	11.75	4.34	16.19	6.16	59.72	1.84	21.00
12195	12.50	4.88	19.44	6.78	50.76	5.64	16.00*
12193	12.74	2.86	14.87	4.05	61.68	3.80	17.25*
11584	11.62	4.38	18.62	8.13	51.69	5.56	19.00
14012	7.85	3.75	13.75	5.48	62.37	6.80	20.00
11367	10.93	5.34	16.56	8.28	53.79	5.10	20.00
11368	11.27	5.48	17.12	7.21	54.55	4.37	20.00
11559	12.11	4.97	17.75	6.82	53.98	4.37	20.00
11560	11.69	5.04	15.75	6.76	56.49	4.27	20.00
12122	9.73	6.57	17.13	7.90	54.08	4.59	18.00
12121	9.97	6.06	16.75	7.41	55.28	4.53	18.00
11397	11.58	5.06	16.12	8.94	53.10	5.20	21.00
12069	10.18	6.33	17.00	6.97	54.92	4.60	20.00
12802	13.28	5.11	18.12	6.48	53.41	3.60	----
11359	11.02	4.86	17.31	7.57	54.96	4.28	20.00
11364	11.30	5.39	16.37	6.55	55.98	4.41	20.00
11378	10.76	5.45	17.56	7.26	54.67	4.30	21.00
11387	11.75	4.37	15.56	6.95	57.32	4.05	20.00
12153	10.68	5.94	16.63	7.22	54.74	4.79	18.50
12128	10.88	5.96	16.32	7.04	55.22	4.58	18.00
14017	8.94	5.42	17.62	8.95	54.20	4.87	18.00
11594	11.24	5.48	17.50	7.15	54.63	4.00	20.00
14016	8.16	6.75	16.37	9.22	54.33	5.17	18.00

* Car load lots delivered.

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
11355	Sunshine Mixed Feed	Hunter Bros., St. Louis	Wallingford, E. E. Hall
			Average of the above 19 analyses of feed from Winter Wheat
			Average of 88 recent analyses
			Highest
	Mixed Feed from Spring Wheat.		Lowest
12120	Best Fine		Hamden, Ira W. Beers
12106	Anchor		Hartford, E. H. Arnold & Son
12105	Minkota		" " " "
12803	No. 2	Pillsbury	" Smith, Northam & Co.
12086		"	" " " "
12082		"	" E. P. Yates & Co.
11375	Superior Mixed Feed	Lake Superior Mills, Wis.	New Britain, C. W. Lines
11376	Golden Bull Mixed Feed	Bay State Milling Co., Winona, Minn.	" " "
14018	Boston	Imperial Mill Co., Duluth	North Haven, The Co-Op. Feed Co.
			Average of the above 9 analyses of feed from Spring Wheat
			Average of 60 recent analyses
			Highest
			Lowest
	Mixed Feed, unclassified.		
11370		Hollister, Crane & Co., N. Y.	Berlin, J. C. Lincoln
11373			" T. B. Wickwire
12116	Boston Feed	T. B. Chase & Son, N. Y.	Bridgeport, Taylor & Clark
12090	No. 1		East Hartford, G. M. White & Co.
12091	No. 2		" "
12099	Michigan Stock Food		Hartford, Daniels Mill Co.
12101	St. Louis Mixed Feed		" "
12102	Boston "		" "
11393	St. Louis "		" "
12070	Boston "		" C. A. Pease & Co.
11555	Mixed Feed	N. Y. City Mills	" E. P. Yates & Co.
11357	Stirling Mixed Feed	Chapin & Co., Boston	Meriden, S. A. Billings
11360	Mixed Feed	" " "	" Meriden Grain and Feed Co.
12109			New Canaan, Grange
12902			New Haven, Abner Hendee
12158			" "
12196	New York Mixed Feed		" R. G. Davis
11591		Hecker Jones Milling Co.	Willimantic, E. A. Buck & Co.
11590	Sterling Mixed Feed	Chapin & Co.	" "
11586	" "	"	" H. A. Bugbee
	Corn Meal.		
12112		W. M. Terry, Bridgeport	Bridgeport, Taylor & Clark
12089		Smith, Northam & Co., Hartford	East Hartford, G. M. White & Co.

Sampled in 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
11355	10.92	4.65	17.00	6.66	56.72	4.05	$20.00
	10.86	5.48	16.87	7.44	54.87	4.48	
	----	----	**16.2**	----	----	**4.5**	
	----	----	18.5	----	----	5.4	
	----	----	13.8	----	----	3.6	
12120	10.42	5.26	16.25	8.27	54.30	5.50	18.00
12106	10.29	5.26	16.75	7.83	54.97	4.90	20.00
12105	11.20	3.75	16.00	5.20	59.63	4.22	20.00
12803	12.05	3.51	15.56	9.36	54.66	4.86	----
12086	10.19	7.11	18.75	9.41	49 45	5.09	18.00
12082	11.16	6.27	17.38	8.57	51.51	5.11	20.00
11375	11.12	5.00	16.69	8.80	53.33	5.06	20.00
11376	11.12	5.75	16.75	9.18	51.56	5.64	20.00
14018	10.08	4.80	16.81	8.05	55.00	5.26	18 00
	10.85	5.18	16.77	8.29	53.84	5.07	
	----	----	**17.3**	----	----	**4.9**	
	----	----	19.8	----	----	5.5	
	----	----	15.6	----	----	3.8	
11370	11.01	5.87	17.50	6.52	54.98	4.12	20.00
11373	11.02	5.27	16.50	8.67	54.16	4.38	20.00
12116	11.00	4.56	16.13	5.57	58.20	4.54	----
12090	10.46	6.05	15.82	6.33	56.77	4.57	20.00
12091	10.79	5.64	16.00	7.04	56.07	4.46	20.00
12099	10.14	5.60	15.00	6.97	57.92	4.37	19.00
12101	10.43	5.37	16.31	7.50	54.99	5.40	19.00
12102	10.17	4.98	16.88	6.75	56.68	4.54	19.00
11393	12.00	5.06	17.62	7.24	54.17	3.91	21.00
12070	10.72	5.04	16.88	6.53	55.37	5.46	20.00
11555	12.00	5.32	16.19	8.65	53.22	4.62	21.00
11357	10.85	5.90	17.81	7.54	53.49	4.41	20.00
11360	10.66	5.85	17.50	7.43	53.56	5.00	20.00
12109	8.06	4.99	19.13	7.43	54.57	5.82	14.00*
12902	8.03	5.98	16.19	9.11	55.96	4.73	20.00
12158	10.87	5.47	18.00	7.66	53.98	4.02	18.00
12196	11.22	5.99	16.00	8.58	53.23	4.98	19.00
11591	12.10	5.78	15.50	9.03	53.46	4.13	20.00
11590	10.61	5.60	19.00	7.94	52.85	4.00	20.00
11586	11.02	5.72	17.19	8.73	53.04	4.30	20.00
12112	14.30	1.31	10.25	2.45	67.98	3.71	17.00
12089	13.91	1.45	9.88	1.50	68.90	4.36	19.00

* Car load lots.

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
12104			Hartford, E. H. Arnold & Son
12076			" Cummings & Garvin
12097			" Daniels Mill Co.
12064			" C. A. Pease & Son
12079			" E. P. Yates & Co.
11604			Middlefield, S. E. Miller
12138			New Haven, R. G. Davis
			Average of the above 9 analyses of Corn Meal
			Average of 17 recent analyses
			Highest
			Lowest
11388	Atlantic Gluten Meal*	Atlantic Starch Works,	Middletown, Meech & Stoddard
12136	" "	Westport, Conn.	New Haven, R. G. Davis
12095	Chicago Gluten Meal	Glucose Sugar Refin'g Co.	East Hartford, G. M. White & Co.
12068	" "	" "	Hartford, C. A. Pease & Co.
12080	" "	" "	" E. P. Yates & Co.
11386	" "	" "	New Britain, Hugh Reynolds
11380	" "	" "	" M. D. Stanley
			Average of the above 5 analyses of Chicago Gluten Meal
			Average of 76 recent analyses
			Highest
			Lowest
11394	Cream Gluten		Hartford, Daniels Mill Co.
12085	"		" Smith, Northam & Co.
11361	"		Meriden, Meriden Grain and Feed Co.
11577	"		Norwich, A. A. Beckwith
			Average of the above 4 analyses of Cream Gluten
			Average of 40 recent analyses
			Highest
			Lowest
11600	King Gluten Meal	Natl. Starch Mfg. Co. (Indianapolis Mill).	Sent by A. Cullen & Co., N. Y. City
			Average of 10 recent analyses
			Highest
			Lowest
12108	King Gluten Meal	Natl. Starch Mfg. Co. (Des Moines Mill).	West Hartford, C. M. Beach
			Average of 39 analyses
			Highest
			Lowest
11599	Gluten Feed, Buffalo	Glucose Sugar Refining Co., Chicago	Bridgeport, Berkshire Mills
11574	" "	Glucose Sugar Refining Co., Chicago	Groton, Groton Grain Co.

*Made from wheat.

SAMPLED IN 1899.

Station No.	ANALYSES.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
12104	13.39	1.22	9.75	1.96	69.74	3.94	$19.00
12076	14.25	1.65	9.45	1.71	68.24	4.70	19.00
12097	14.65	1.56	9.44	1.71	68.20	4.44	18.00
12064	17.38	1.40	9.56	1.65	66.82	3.19	19.00
12079	13.61	1.91	9.56	1.66	69.05	4.21	19.00
11604	12.35	1.26	10.00	1.75	70.96	3.68	----
12138	16.54	1.39	9.51	1.63	67.14	3.79	19.00
	14.49	1.46	9.71	1.78	68.56	4.00	
	----	----	**9.5**	----	----	**4.0**	
	----	----	10.8	----	----	4.7	
	----	----	8.6	----	----	2.7	
11388	8.66	1.12	48.75	0.85	38.92	1.70	25.00
12136	7.26	1.07	49.06	0.88	39.69	2.04	21.00
12095	10.26	1.05	41.29	1.10	44.43	1.87	23.00
12068	11.86	1.83	35.94	1.50	46.85	2.02	23.50
12080	17.16	1.22	36.25	1.41	42.34	1.62	24.00
11386	11.56	1.85	37.75	1.52	44.69	2.63	30.00
11380	10.79	0.60	34.62	1.56	48.24	4.19	25.00
	12.32	1.31	37.17	1.42	45.32	2.46	
	----	----	**36.7**	----	----	**2.7**	
	----	----	41.3	----	----	7.6	
	----	----	31.7	----	----	1.4	
11394	10.00	0.99	32.12	2.36	52.24	2.29	25.00
12085	11.25	0.95	34.94	1.35	47.73	3.78	20.00
11161	9.90	0.54	35.37	1.43	51.06	1.70	24.00
11577	9.27	0.84	34.12	1.49	52.30	1.98	25.00
	10.10	0.83	34.14	1.65	50.84	2.44	
	----	----	**34.1**	----	----	**3.2**	
	----	----	41.3	----	----	6.1	
	----	----	30.1	----	----	1.6	
11600	7.40	0.45	33.12	1.21	55.03	2.79	----
	---	----	**34.62**	----	----	4.80	
	----	----	37.32	----	----	6.87	
	----	----	32.11	----	----	2.65	
12108	8.15	0.89	32.07	1.93	41.69	15.27	----
	----	----	**32.89**	----	----	**15.35**	
	----	----	37.06	----	----	19.77	
	----	----	26.38	----	----	11.71	
11599	10.10	2.60	27.00	7.10	50.03	3.17	20.00
11574	10.12	1.67	27.12	7.27	51.48	2.34	25.00

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
12123	Gluten Feed, Buffalo	Glucose Sugar Refining Co., Chicago	Hamden, Ira W. Beers
11377	" "	Glucose Sugar Refining Co., Chicago	New Britain, C. W. Lines
12155	" "	Glucose Sugar Refining Co., Chicago	New Haven, J. T. Benham
14015	" "	Glucose Sugar Refining Co., Chicago	North Haven, Cooperative Feed Co.
12150	" Rockford	Glucose Sugar Refining Co., Chicago	New Haven, Abner Hendee
12899	" "	Glucose Sugar Refining Co., Chicago	" " "
11570	" "	Glucose Sugar Refining Co., Chicago	New London, Arnold Rudd
			Average of the above 6 analyses of Buffalo Gluten Feed
			Average of 34 recent analyses
			Highest
			Lowest
11568	Golden Gluten Feed	Glucose Sugar Refining Co.	New London, Beebe & Brogan
			Average of 15 recent analyses
			Highest
			Lowest
12133	Diamond Gluten Feed	Glucose Sugar Refining Co.	New Haven, R. G. Davis
11597	" " "	Glucose Sugar Refining Co.	Rockville, Edward White
			Average of 30 recent analyses
			Highest
			Lowest
12821	Gluten Feed	National Starch Mfg. Co.	
11598	"	" "	Bridgeport, Berkshire Mills Co.
11374	Gluten		Berlin, T. B. Wickwire
12124	Gluten Meal		Hamden, Ira W. Beers
	Hominy Chop.		
11562		American Cereal Co.	Guilford, F. H. Rolf
12129			New Haven, R. G. Davis
12908	"White Meal"		" Abner Hendee
14019	"	C. M. Cox & Co., Boston	North Haven, Co-öp. Feed Co.
14011	"Hominy Meal"	Miner, Hillard Co., Wilkesbarre	Meriden, A. H. Cashen
11603	"	Indianapolis H. Co.	Middlefield, S. E. Miller
11391	"	C. M. Cox & Co., Boston	Middletown, Meech & Stoddard
11354	"	Chapin & Co., Boston	Wallingford, E. E. Hall
			Average of the above 8 analyses of Hominy Chop
			Average of 20 recent analyses
			Highest
			Lowest

SAMPLED IN 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
12123	9.85	2.60	28.57	6.08	49.73	3.17	$18.50
11377	9.20	1.55	27.75	6.60	50.81	4.09	23.00
12155	10.04	2.83	26.32	6.58	51.24	2.99	19.00
14015	8.46	2.39	27.12	6.85	51.48	3 70	18.00
12150	8.77	0.90	25.19	7.07	54.30	3.77	19.00
12899	7.21	0.64	22.81	6.34	59.79	3.21	20.00
11570	9.55	0.88	30.12	6.85	49.26	3.34	19.00
	9.63	2.27	27.31	6.74	50.80	3.25	
	----	----	**27.5**	----	----	**3.1**	
	----	----	29.6	----	----	4.7	
	----	----	25.3	----	----	2.3	
11568	8.48	0.82	27.25	6.58	53.12	3.75	22.00
	----	----	**27.00**	----	----	**3.00**	
	---	----	29.6	----	----	4.0	
	----	----	23.6	----	----	2.0	
12133	9.87	0.88	23.69	5.85	56.14	3.57	19.00
11597	8.99	0.72	24.37	6.65	55.75	3.52	22.00
	----	----	**23.6**	----	----	**3.6**	
	----	----	30.1	----	----	5.0	
	----	----	20.3	----	----	2.3	
12821	7.35	0.60	21.37	7.43	57.07	6.18	----
11598	6.77	0.88	19.87	7.63	53.33	11.52	20.00
11374	9.75	0.40	26.19	3.58	56.37	3.71	20.00
12124	8.17	0.98	18.94	7.94	53.25	10.72	18.00
11562	10.65	2.46	11.25	7.61	62.92	5.11	19.00
12129	7.14	3.00	12.00	4.01	64.36	9.49	18.00
12908	6.85	1.93	11.37	3.22	69.07	7.56	18.00
14019	7.85	2.45	11.25	5.96	63.23	9.26	17.00
14011	6.36	2.81	10.87	4.18	67.32	8.46	16.50
11603	9.66	3.32	11.06	5.10	61.86	9.00	----
11391	10.20	2.80	11.75	5.43	61.15	8.67	18.00
11354	8.71	1.95	11.25	3.85	67.31	6.93	18.00
	8.43	2.60	11.35	4.92	64.64	8.06	
	----	----	**11.2**	----	----	**7.8**	
	----	----	12.0	----	----	9.7	
	----	----	10.3	----	----	4.0	

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
11371	Ground Oats	Miner & Hillard Co., Wilkesbarre	Berlin, J. C. Lincoln
11558	"	R. J. Hardy, Boston	Guilford, G. F. Walters
	Provender.		
11573		Valley Grain Co., Brattleboro, Vt.	Groton, Groton Grain Co.
11556		Guilford Town Mill	Guilford, G. F. Walters
12075			Hartford, C. A. Pease & Co.
11554		M. L. Crittenden, Buffalo	" E. P. Yates & Co.
11605		S. E. Miller	Middlefield, S. E. Miller
12140		American Cereal Co.	New Haven, R. G. Davis
12154	Benham's	J. T. Benham	" J. T. Benham
12904			" Abner Hendee
11572		E. W. Bailey & Co., Montpelier, Vt.	New London, Arnold Rudd
11581		Cutler Co., N. Wilbraham, Mass.	Norwich, Norwich Grain Co.
11356		American Cereal Co., Chicago	Wallingford, E. E. Hall
11589		E. A. Buck & Co.	Willimantic, E. A. Buck & Co.
11592		M. L. Crittenden, Buffalo	" W. D. Grant
			Average of the above 13 analyses of Hominy Chop
			Average of 22 recent analyses
			Highest
			Lowest
12819	Corn and Oat Feed	Miner, Hillard Co., Wilkesbarre, Pa.	Torrington, Geo. W. Greene
11382	Defiance Corn and Oat Feed	H-O. Co., Buffalo	New Britain, Hugh Reynolds
11369	Victor Corn and Oat Feed	American Cereal Co.	Berlin, J. C. Lincoln
11564	Victor Corn and Oat Feed	" "	Guilford, F. H. Rolf
11365	Victor Corn and Oat Feed	" "	Meriden, A. H. Cashen
11593	Victor Corn and Oat Feed	" "	Rockville, Edw. White
12127	Champion Bell Fodder	Hollister, Crane & Co., N. Y.	New Haven, R. G. Davis
12098	Quaker Oat Feed	Amer'n Cereal Co., Chi'go	Hartford, Daniels Mill Co.
12073	" "	" " "	" C. A. Pease & Co.
12148	" "	" " "	New Haven, Abner Hendee
11596	" "	" " "	Rockville, Edward White
11583	" "	" " "	Willimantic, H. A. Bugbee
			Average of the above 5 analyses of Quaker Oat Feed
			Average of 36 recent analyses
			Highest
			Lowest

SAMPLED IN 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
11371	10.10	3.69	10.94	10.35	59.94	4.98	----
11558	9.69	4.78	8.25	19.67	54.46	3.15	$16.00
11573	12.72	1.87	8.94	4.51	67.59	4.37	20.00
11556	12.36	1.94	10.50	4.53	66.30	4.37	21.00
12075	11.59	2.53	10.44	5.10	65.81	4.53	21.50
11554	10.96	3.03	9.50	13.85	59.33	3.33	20.00
11605	12.00	1.80	10.56	4.52	66.79	4.33	----
12140	11.28	4.36	9.25	9.52	61.44	4.15	19.00
12154	11.99	1.81	10.13	4.18	67.48	4.41	20.00
12904	8.35	3.61	7.94	13.75	63.21	3.14	18.00
11572	12.08	1.82	8.87	6.14	67.46	3.63	20.00
11581	12.55	1.81	10.00	3.85	66.97	4.82	20.00
11356	9.11	3.83	7.94	15.28	60.89	2.95	19.00
11589	12.65	1.88	10.81	5.27	65.18	4.21	21.00
11592	10.24	4.02	9.25	13.40	59.82	3.27	20.00
	11.57	2.64	9.55	7.99	64.49	3.96	
	----	----	9.4	----	----	3.8	
	----	----	11.4	----	----	5.4	
	----	----	7.4	----	----	2.4	
12819	7.13	3.98	10.56	3.06	70.92	4.35	20.00
11382	9.86	4.44	9.37	13.54	59.64	3.15	----
11369	8.77	4.12	9.87	12.85	59.78	4.61	18.00
11564	11.08	3.58	9.37	11.83	60.16	3.98	20.00
11365	10.66	3.77	8.50	12.85	61.53	2.69	19.00
11593	9.03	4.72	10.62	13 60	57.80	4.23	19.00
12127	9.14	3.31	9.88	12.88	59.75	5.04	18.00
12098	7.44	5.25	11.44	17.16	54.71	4.00	18.00
12073	7.95	5.39	11.56	15.83	55.30	3.97	19.50
12148	8.37	5.30	10.25	19.58	53.80	2.70	17.00
11596	8.42	5.05	13.12	17.73	51.83	3.85	18.00
11583	7.90	4.77	11.94	18.95	53.01	3.43	18.00
	8.01	5.15	11.66	17.85	53.74	3.59	
	----	----	10.26	----	----	3.4	
	----	----	12.8	----	----	4.3	
	----	----	7.4	---	----	2.7	

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
12820	Crescent Oat Feed	A. Cullen & Co., N. York	
11400	Joliet Oat Feed		Hartford, E. P. Yates & Co.
12083	" "		" " " "
12114	Oat Feed	T. B. Chase & Son, N. Y.	Bridgeport, Taylor & Clarke
12107	" No. 2		Hartford, E. H. Arnold & Son
12100	" No. 2		" Daniels Mill Co.
11606	"	Illinois Cereal Co.	Middlefield, S. E. Miller
12903	"		New Haven, Abner Hendee
12197	"		Putnam, J. W. Andrews
12190	Oat Chaff		New Haven, R. G. Davis
12091	Corn, Oats and Barley	American Cereal Co.	East Hartford, G. M. White & Co.
11561	" " "	" "	Guilford, F. H. Rolf
11366	Quaker Dairy Feed	American Cereal Co., Chicago	Berlin, J. C. Lincoln
11563	" "	American Cereal Co., Chicago	Guilford, F. H. Rolf
11390	" "	American Cereal Co., Chicago	Middletown, Meech & Stoddard
12134	" "	American Cereal Co., Chicago	New Haven, R. G. Davis
11579	" "	American Cereal Co., Chicago	Norwich, A. A. Beckwith
			Average of the above 5 analyses of Quaker Dairy Feed
12094	Stock Food, Corn, Oats and Barley	American Cereal Co.	East Hartford, G. M. White & Co.
11595	American Poultry Food	American Cereal Co.	Rockville, Edward White
			Average of 14 recent analyses
			Highest
			Lowest
11363	H-O Dairy Feed	H-O Co., Buffalo, N. Y.	Meriden, Meriden Grain and Feed Co.
12141	" "	" " "	New Haven, R. G. Davis
12907	" "	" " "	" Abner Hendee
11582	" "	" " "	Norwich, Norwich Grain and Feed Co.
11352	" "	" " "	Wallingford, E. E. Hall
11587	" "	" " "	Willimantic, H. A. Bugbee
			Average of the above 6 analyses of H-O Dairy Feed
			Average of 20 recent analyses
			Highest
			Lowest

SAMPLED IN 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch, gum, etc.)	Ether Extract.	
12820	6.36	5.60	7.25	23.28	54.34	3.17	----
11400	9.35	5.23	8.94	21.80	52.03	2.65	$19.00
12083	8.26	5.12	7.88	20.55	55.14	3.05	19.00
12114	7.24	5.77	8.75	21.88	53.50	2.86	16.00
12107	6.74	5.93	6.44	26.64	51.59	2.66	19.00
12100	6.20	5.77	7.06	24.88	53.30	2.79	16.00
11606	8.51	5.78	6.87	27.19	49.18	2.47	----
12903	6.67	4.71	11.25	20.22	54.38	2.77	15.00
12197	9.03	4.19	4.37	28.11	52.81	1.49	15.00
12190	7.80	7.48	5.12	28.53	49.17	1.60	7.00
12091	9.33	4.46	12.50	11.33	57.71	4.67	20.00
11561	9.60	4.48	11.31	13.15	56.85	4.61	21.00
11366	8.26	4.89	13.19	16.12	53.74	3.80	18.00
11563	9.50	5.27	11.31	18.47	51.94	3.51	19.00
11390	7.86	4.92	13.75	17.39	52.34	3.74	19.00
12134	8.02	5.30	11.69	15.66	54.98	4.35	17.00
11579	7.94	4.63	14.12	16.62	52.73	3.96	18.00
	8.31	5.00	12.81	16.85	53.16	3.87	
12094	9.33	4.46	12.50	11.33	57.71	4.67	20.00
11595	9.56	2.95	13.62	7.20	60.49	6.18	24.00
	----	----	17.5	----	----	5.5	
	----	----	19.5	----	----	6.0	
	----	----	15.0	----	----	4.7	
11363	9.00	2.82	17.31	13.15	53.72	4.00	22.00
12141	9.67	4.50	20.32	12.46	48.88	4.17	19.00
12907	7.57	3.47	18.75	13.10	53.42	3.69	21.00
11582	8.59	3.51	18.69	13.40	51.94	3.87	21.00
11352	8.80	4.45	18.87	12.18	51.47	4.23	22.00
11587	9.31	4.21	17.62	15.27	49.79	3.80	21.00
	8.82	3.83	18.59	13.26	51.54	3.96	
	----	----	19.0	----	----	4.4	
	----	----	21.2	----	----	5.4	
	----	----	15.5	----	----	3.7	

TABLE II.—*Continued.* ANALYSES OF COMMERCIAL FEEDS. (☞)

Station No.	Name of Feed.	Manufacturer or Jobber.	Retail Dealer.
12110	H-O Horse Feed	H-O Co., Buffalo, N. Y.	Bristol, Geo. Eaton
11399	" "	" " "	Hartford, Daniels Mill Co.
11362	" "	" " "	Meriden, Meriden Grain and Feed Co.
12139	" "	" " "	New Haven, R. G. Davis
12145	" "	" " "	" Abner Hendee
12897	" "	" " "	" " "
11580	" "	" " "	Norwich, Norwich Grain Co.
11351	" "	" " "	Wallingford, E. E. Hall
11588	" "	" " "	Willimantic, H. A. Bugbée
			Average of the above 9 analyses of H-O Horse Feed
			Average 18 recent analyses
			Highest
			Lowest
12191	H-O Poultry Food	H-O Co., Buffalo	New Haven, R. G. Davis
12898	" "	" "	" Abner Hendee
11353	" "	" "	Wallingford, E. E. Hall
			Average of the above 3 analyses of H-O Poultry Feed
			Average of 14 recent analyses
			Highest
			Lowest
12072	Rye Bran		Hartford, C. A. Pease & Co.
12157	"		New Haven, J. T. Benham
12130	"		" R. G. Davis
12146	"		" Abner Hendee
12905	Rye Feed		" "
12261	Malt Hulls	H. C. Edwards, Chicago	West Cornwall, T. S. Gold*
12078	Schumacher's Starch Feed	American Cereal Co.	Hartford, Cummings & Garvin
12135	Glen Cove Starch Feed	Nat'l Starch Mfg. Co.	New Haven, R. G. Davis
12188	Blatchford's Calf Meal	J. W. Barwell, Waukegan, Ill.	New Haven, R. G. Davis
12189	Pioneer Clover Meal	The Bennett & Millett Co., Gouverneur, N. Y.	New Haven, R. G. Davis
12198	Carob Bean		
12199	Carob Bean (Seeds)		
12200	Carob Bean (Hulls)		
11358	Animal Meal	Bowker Fertz. Co., Boston	Meriden, S. A. Billings
14013	Poultry Food	J. Lederer & Co., New Haven	
12896	Beef Scraps		New Haven, Abner Hendee

* Not a dealer.

SAMPLED IN 1899.

Station No.	Analyses.						Price per ton.
	Water.	Ash.	Protein.	Fiber.	Nitrogen-Free Extract. (Starch. gum, etc.)	Ether Extract.	
12110	9.21	3.23	12.07	10.34	61.04	4.11	----
11399	10.28	3.64	13.25	10.19	58.59	4.05	$22.00
11362	10.38	1.95	12.87	9.10	61.80	3.90	22.00
12139	9.92	3.17	11.13	10.68	60.88	4.22	21.00
12145	10.51	2.98	11.63	10.43	59.98	4.47	24.00
12897	8.02	3.28	13.12	8.79	62.74	4.05	21.00
11580	10.35	2.91	12.62	9.51	60.58	4.03	21.00
11351	10.29	2.78	12.50	9.95	60.17	4.31	22.00
11588	10.40	3.47	12.06	11.63	58.64	3.80	21.00
	9.93	3.05	12.36	10.07	60.49	4.10	
	----	----	12.4	----	----	4.2	
	----	----	13.8	----	----	4.8	
	----	----	11 0	----	----	3.6	
12191	8.91	2.63	17.12	4.87	60.46	6.01	30.00
12898	8.00	3.01	17.75	4.91	60.66	5.67	33.00
11353	10.80	2.32	15.00	2.86	64.35	4.67	26.00
	9.23	2.65	16.62	4.21	61.84	5.45	
	----	----	17.5	----	----	5.5	
	----	----	19.5	----	----	6.0	
	----	----	15.0	----	----	4.7	
12072	11.75	3.69	14.81	2.97	63.95	2.83	20.00
12157	12.45	3.00	14.50	3.15	64.18	2.72	18.50
12130	12.17	3.03	14.25	2.92	64.74	2.88	18.00
12146	12.54	3.02	14.69	3.01	63.90	2.84	19.00
12905	8.67	3.44	14.50	2.70	68.08	2.61	22.00
12261	7.73	6.14	10.44	22.77	51.76	1.16	12.00†
12078	9.32	4.82	12.69	9.78	58.84	4.55	21.00
12135	11.20	0.54	21.13	3.15	60.73	3.25	19.00
12188	8.93	5.46	24.75	5.06	51.11	4.69	70.00
12189	8.36	6.76	9.50	28.28	44.68	2.42	40.00
12198	14.05	3.26	5.57	4.98	71.80	0.34	----
12199	12.84	3.27	15.00	7.16	59.90	1.83	----
12200	14.15	3.25	4.81	4.80	72.77	0.22	----
11358	6.20	41.43	36.94	----	4.18	11.25	40.00
14013	7.48	21.10	51.12	2.01	2.21	16.08	36.00‡
12896	7.64	17.90	49.12	3.79	5.29	16.26	35.00

† Car load lots delivered. ‡ Wholesale price.

Summary.

No cases of actual adulteration have been found among the samples examined.

A considerable number of these "feeds," notably most of the so-called "oat-feeds," are however of such inferior quality that they cannot be used to any profit.

It appears that the three most concentrated feeds, the three which, pound for pound, will go further in "balancing" or piecing out the ration made from home-grown feed, viz: cotton seed, linseed and Atlantic gluten meal, are the most costly. This is as it should be. Yet of these, the one which contains the most protein, "Atlantic gluten meal," is the cheapest. It does not follow that it should be bought to the exclusion of the others. Linseed meal, though a very expensive feed, is greatly relished by cattle, flavors the food and is generally regarded as an excellent thing to keep cows "in condition."

But evidently the wise feeder will endeavor to use the cheaper forms of protein, *as far as possible.*

An examination of the prices and analyses of the feeds given in the table also shows that the market prices bear very little if any relation to their feeding value. That is, "feed" costs from $17.00 to $20.00 per ton at retail, whether it is concentrated, rich in protein, and well suited to supplement the home-grown feed, or whether it is a starchy food and of much less value in compounding suitable cattle rations. In this condition of the market, special care in the purchase of feeds and some knowledge of their chemical composition will be found highly advantageous in keeping the cost of milk production down to a point which will admit of profit in the business.

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